Consolidated Program for Research and Development for Welding of High Strength Steel Pipelines, #277 & 278

PUBLIC PAGE

QUARTERLY REPORT

Project WP#277: Update of Weld Design, Testing, and Assessment Procedures for High Strength Pipelines

For Period Ending: February 28, 2009

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Prepared By: Yong-Yi Wang, Ph.D.
Principal Investigator
CRES (Center for Reliable Energy Systems)
6059 Frantz Road, Suite 101
Dublin, OH 43017
614-808-4872
ywang@CRES-americas.com

Mr. Ben Dudley
Team Project Manager
Electricore, Inc.
27943 Smyth Drive, Suite 105
Valencia, CA 91355
ben@electricore.org

Ken Lorang
Team Project Manager and Technical Coordinator
Pipeline Research Council, International
1401 Wilson Blvd., Suite 1101
Arlington, VA 22209
klorang@prci.org

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Background

High strength pipelines are expected to become a major player in long distance onshore hydrocarbon transportation. Understanding the differences between the modern high strength and older-generation linepipes is critical to the safe and economical application of those modern materials. The objectives of this project to fill the critical gaps and provide guidelines on the effective use of high strength linepipes, from design and testing to weld integrity assessment procedures. The interdependence of linepipe materials, welding processes, design requirements, and weld integrity will be investigated to enable realistic and effective use of high strength linepipes.

Progress in the Quarter

The activities in the sixth quarter of this project covered (1) development of test specimen allocation plans for the second round of welds, (2) update of linepipe specifications, (3) continued development of weld metal tensile and toughness testing protocols, (4) further analysis of weld strength mismatch requirements for stress- and strain-based designs, (5) trial testing of medium-scale specimens, (6) development of fatigue pre-cracking fixture for medium-scale specimens, and communication of program progress to standards committees.

Joint web-conferences with Project 278 have been held once every two weeks. Draft specimen allocation plans were developed for the second round of girth welds. Task report on linepipe property specifications has been drafted. Work is under way to address girth weld tensile strength test methods using a range of specimen geometries, including standard round bars, full-strip and split-strip tensile specimens. The fracture toughness testing protocol has been developed by means of numerical analysis and experimental testing., A draft SE(T) testing protocol has been issued, and SE(B) and SE(T) specimens have been machined and tested. A large matrix of analysis has been completed to develop weld strength mismatch requirements for both stress-based and strain-based designs. The preparation for medium scale testing is largely complete. The test procedure of the medium-scale specimens was tried by loading a trial specimen in the actual test frame.